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T.I.

RESEARCH ORDER #1
PHASE IIa - PROGRESS REPORT #3

10 FEBRUARY 1955

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RESEARCH ORDER #1 **10 FEBRUARY 1955**
PHASE IIa - PROGRESS REPORT #3

This report covers the period from December 15, 1954 to February 15, 1955.

OBJECTIVE:

To design and construct two complete sets of equipment (4 units) to serve as design approval models, based upon the results of the work accomplished in Phase I.

GENERAL DATA:

The design portions of the work to be performed according to Bid Proposal No. 76-1, Phase IIa, may, as a result of the work accomplished in Phase I, be summarized as follows:

A. Design of a suitable optical system for transmitting and receiving to include the following:
   1. A light source which is a thirty watt tungsten lamp as previously described in Final Report of Study Phase I, dated 23 August 1954.
   2. A reflector of 8 inch diameter (6" X 6" square aperture), 6 inch focal length, with a circle of least confusion of approximately .030" effective diameter.
   3. A suitable condenser lens system, using lenses of 1.5 inch aperture and 1.5 inch focal length.
   4. A mechanical modulator, as discussed in the Final Report of Study Phase I, for modulating the light from the tungsten lamp and for operating from the transmitter amplifier.
   5. A standard "Ektron" lead sulfide cell for receiving modulated light from the transmitter and for furnishing a voice modulated signal to the receiver. The cells considered are 1 mm X 1 mm in dimension and have a dark resistance of approximately 400,000 ohms.

B. Design of a suitable electronic system for transmitting and receiving voice intelligence.
C. Design of a suitable power supply for the electronic system.
D. Choice of a suitable power source to furnish power to the entire system.

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E. Design of a night viewer to assist in the find operation. This was decided upon as a result of our experience in field-testing a breadboard of the equipment and was confirmed by the opinion of agency personnel.
F. Design of a battery charger to be incorporated as an integral part of the equipment. This decision resulted from discussions with agency personnel.
G. Design of mechanical system.

At this time, the work remaining to be performed according to Bid Proposal No. 76-1, Phase IIa may be defined as follows:

1. Completion of construction of the first of four design approval models.
2. Test of the design approval model.
3. Construction of the remaining three of the four design approval models and submission of the four models for evaluation.

DISCUSSION:

Optical System

During the period from December 15th, the design, layout and construction of the optical system for the first design approval model was completed. This system was tested for range on our vacuum range unit in the laboratory with excellent results, in spite of the fact that we used a make-shift electronic unit in conducting the test.

Minor modifications are presently being made in the optical system. This work will be completed within the next few days.

Electronic System and Night Viewer

An electronic unit has been constructed for the first design approval model. Three more electronic units are presently being constructed, to complete requirements for the four design approval models.

The first of four vibrator power supplies for the electronic system has been completed. Three more units are required for design approval

models. These three units will be constructed this month. A battery charger and regulator has been constructed and tested. Performance is considered satisfactory. Slight modification was required in transformer size. The new transformers are expected February 15th, and the charger-regulator for the first design approval model can be finished immediately.

Major problems in the design of a suitable Night Viewer have been resolved, and it is expected that four viewers will be completed by March 15th. The experimental and development work required turned out to be more extensive then originally anticipated.

Mechanical System

A complete mechanical system has been constructed.

We are now in the process of constructing the first of four design approval models. Construction of this model will be completed within the next week.

PROGRAM FOR NEXT TIME INTERVAL:

There will be relatively minor changes in the construction of the mechanical system. We expect to have three design approval models constructed by March 15th.

Following completion and test of the design approval models we expect to start producing the remaining twenty (20) units not later than April 1st.

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PTS/mgb